SEQUENCE LISTING

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CHEN, ROUYING

<120> TRANSCRIPTION FACTOR STRESS-RELATED PROTEINS AND METHODS OF USE IN PLANTS

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<140> 09/828,303
<141> 2001-04-06

<150> 60/196,001
<151> 2000-04-07

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<210> 14
<211> 2367
<212> DNA
<213> Physcomitrella patens

<400> 14
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gaagacatgg aaattccctt aggtcgagat ggcgagggta tgcagtcaaa gcagtgcccg 180
cgcggccact ggcgtccagc ggaagacgac aagttgcgag aactagtgtc ccagtttgga 240
cctcaaaact ggaatctcat agcagagaaa cttcagggtc gatcagggaa aagctgcagg 300

ctacggtggt tcaatcagct ggaccctcgc atcaaccggc acccattctc ggaagaagag 360
gaagagcggc tgcttatagc acacaagcgc tacggcaaca agtgggcatt gatcgcgcgc 420
ctctttccgg gccgcacaga caacgcggtg aagaatcact ggcacgttgt gacggcaaga 480
cagtcccgtg aacggacacg aacttacggc cgtatcaaag gtccggtaca tcgaagaggc 540
aagggtaacc gtatcaatac ctccgcactt ggaaattacc atcacgattc gaagggagct 600
ctcacagcct ggattgagtc gaagtatgcg acagtcgagc agtctgcgga agggctcgct 660
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<210> 15
<211> 787
<212> DNA
<213> Physcomitrella patens

<400> 15
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taacgagtcc gggggtcatt accgagacca ggatgcttct gtacgggaac aggatcggtt 180
cctgcccatc gcgaacgtga gccgaatcat gaagaaggcg ttgccgtcta atgcaaaaat 240
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tggtgaggcg tcagataagt gccagaggga gaagagaaag acgatcaacg gtgacgactt 360
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cggtatgaac ggtacgatga acgggaatat gcatggacat ggaatcccgg tgtcgatgca 600
gatgctgcag cagtcgtacg gacagcaggc acctccaggg atgatgtatt ccccttcatca 660
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<210> 16
<211> 1669
<212> DNA
<213> Physcomitrella patens

<400> 16
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cgttagcttt agcagctgca aaggccgcca tggaggctgc ctcgtacgct gatgcgatgc 180
cgtggaacag gaggagtttc cgacggaatt tgatctgctg agactagaga gggccaggtt 240
gagcgatgtt gagcattctt ttcgggttga attggataca gaggctgcca tgatggaggc 300
cgagcagagt tatgtgcaga agctagaatc gttgttggga ggtgtttcca cgctcgtccg 360
tgaggaagag gaaactgcat ccgtttcaga agatgaagat gattcaaaca gcttacctca 420
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cttagatgtg aaatctgacg ctatttaatt gctgctgatt gatagtacct accaaaccag 1560
gaaaaaggca tttggtaatg tttcgatcag aaagtagact gttacataag tttccattct 1620
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<210> 17
<211> 141
<212> PRT
<213> Physcomitrella patens

<400> 17
Met Arg Leu Ala Ala Lys Asp Thr Ser Gly Arg Asn Ala Phe Lys Phe
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Arg Asn Ile Asp Leu Asn Lys Ala Pro Ser Ala Trp Asp Thr Glu Glu
20 25 30

Val Ser Ala Ser Asn Thr Gly Asp Thr Thr Ser Phe Arg Gly Val Arg
35 40 45

His Arg Pro Glu Leu Asn Lys Trp Val Thr Glu Ile Arg Pro Thr Ser
50 55 60

Gln Lys Arg Lys Ile Trp Leu Gly Thr Tyr Glu Thr Pro Glu Glu Ala
65 70 75 80

```
Ala Arg Ala Tyr Asp Val Gly Ile Phe Tyr Thr Lys Lys Lys Ile Pro
                85                  90                  95

Tyr Asn Phe Glu Asp Ser Pro Gln Gln Leu Gln Leu Tyr Pro Ile Pro
            100                 105                 110

Pro Glu Leu Pro Trp Glu Ser Phe Ala Ala Leu Val Lys Gln Arg Ala
        115                 120                 125

Thr Ser Ala Ala Lys Arg Ala Arg Val Pro Ser Ser Ser
    130                 135                 140
```

<210> 18
<211> 337
<212> PRT
<213> Physcomitrella patens

<400> 18

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Met Val Val Ala Val Ala Val Leu Phe Ala Val Val Leu Phe Ile Leu
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Cys Leu His Ile Tyr Ala Lys Trp Phe Trp Arg Asn Gln Gly Ala Ile
            20                  25                  30

Val Ala Ser Asp Gly Thr Leu Arg Thr Leu Ser Trp Arg Arg Arg Arg
        35                  40                  45

Tyr Thr Val Pro Val Asn Ala Thr Pro Val Thr Gln Ala Val Gly Leu
    50                  55                  60

Glu Arg Ala Val Ile Glu Ala Leu Pro Thr Phe Glu Phe Asp Gly Glu
65                  70                  75                  80

Arg Ala Lys Arg Val Phe Glu Cys Ala Val Cys Leu Glu Glu Phe Glu
                85                  90                  95

Leu Gly Glu Lys Gly Arg Thr Leu Pro Lys Cys Asp His Ser Phe His
            100                 105                 110

Leu Asp Cys Ile Asp Met Trp Leu His Ser His Ser Thr Cys Pro Leu
        115                 120                 125

Cys Arg Thr Ser Val Gly Ala Asp Glu Thr Glu Lys Lys Thr Glu Ala
    130                 135                 140

Ala Thr Val Met Gln Ile Ser Glu Pro Pro Gln Met Glu Ala Pro Val
145                 150                 155                 160

Met Gly Asp Val Gly Ala Pro Phe Met Ala Ala Met Arg Ala Ser Arg
                165                 170                 175

Arg Ser Gln Arg Ser Arg Gly Gln Leu Pro Ala Leu Asn Ser Ser Pro
            180                 185                 190

Arg Gly Asn Ser Leu Pro Arg Thr Ala Glu Asp Gln Gly Gly Glu Asn
        195                 200                 205
```

```
His Arg Arg Ser Gly Thr Ser Glu Thr Ala Val Ala Val Asp Gln Gln
    210                 215                 220

Gln Asn Ile Lys Asp Tyr Glu Thr Pro Ser Gly Ile Pro Ser Asn Val
225                 230                 235                 240

Leu Phe Trp Gly Asn His Ala Gln Met Ser Ser Ala Gly Ala Gly Gly
                245                 250                 255

Ser Ala Glu Ala Arg Ala Ala Ser Ser Ile Arg Ala Pro Phe Gln Val
            260                 265                 270

Thr Ile Asp Ile Pro Arg Ser Gly Pro Ala Ala Val Ser Asn Ser Ser
        275                 280                 285

Asn Val Leu Ser Pro Met Ala Arg Ala Ser Ala Ser Phe Arg Arg Leu
    290                 295                 300

Leu Ser Arg Gly Lys Ser Val Val Ser Pro Gln Thr Gly Glu Asp Gly
305                 310                 315                 320

Val Asp Glu Gly Gly Pro Ser Ser Ser Pro Arg Pro Pro Pro Pro His
                325                 330                 335

Ala
```

<210> 19
<211> 605
<212> PRT
<213> Physcomitrella patens

<400> 19

```
Met Thr Ala Leu Thr Asn Ser Glu Ala Lys Lys Lys Phe Glu Phe Leu
  1               5                  10                  15

Glu Ala Val Ser Gly Thr Met Asp Ala His Leu Arg Tyr Phe Lys Gln
            20                  25                  30

Gly Tyr Glu Leu Leu His Gln Met Glu Pro Tyr Ile His Gln Val Leu
        35                  40                  45

Thr Tyr Ala Gln Gln Ser Arg Glu Arg Ala Asn Tyr Glu Gln Ala Ala
    50                  55                  60

Leu Ala Asp Arg Met Gln Glu Tyr Arg Gln Glu Val Glu Arg Glu Ser
65                  70                  75                  80

Gln Arg Ser Ile Asp Phe Asp Ser Ser Ser Gly Asp Gly Ile Gln Gly
                85                  90                  95

Val Gly Arg Ser Ser His Lys Met Ile Glu Ala Val Met Gln Ser Thr
            100                 105                 110

Pro Lys Gly Gln Ile Gln Thr Leu Lys Gln Gly Tyr Leu Leu Lys Arg
        115                 120                 125
```

```
Ser Thr Asn Leu Arg Gly Asp Trp Lys Arg Arg Phe Phe Val Leu Asp
    130                 135                 140

Ser Arg Gly Met Leu Tyr Tyr Tyr Arg Lys Gln Trp Gly Lys Pro Thr
145                 150                 155                 160

Asp Glu Lys Asn Val Ala His His Thr Val Asn Leu Leu Thr Ser Thr
                165                 170                 175

Ile Lys Ile Asp Ala Glu Gln Ser Asp Leu Arg Phe Cys Phe Arg Ile
            180                 185                 190

Ile Ser Pro Ala Lys Ser Tyr Thr Leu Gln Ala Glu Asn Ala Ile Asp
        195                 200                 205

Arg Met Asp Trp Met Asp Lys Ile Thr Gly Val Ile Ser Ser Leu Leu
    210                 215                 220

Asn Asn Gln Ile Ser Glu Gln Val Asp Gly Glu Asp Ser Asp Val Ser
225                 230                 235                 240

Arg Ser Gly Ala Ser Asp Gln Ser Gly His Glu Arg Pro Leu Asp Val
                245                 250                 255

Leu Arg Lys Val Lys Gly Asn Asp Ala Cys Ala Asp Cys Gly Ala Ala
            260                 265                 270

Asp Pro Asp Trp Ala Ser Leu Asn Leu Gly Ile Leu Leu Cys Ile Glu
        275                 280                 285

Cys Ser Gly Val His Arg Asn Met Ser Val Gln Ile Ser Lys Val Arg
    290                 295                 300

Ser Leu Thr Leu Asp Val Lys Val Trp Glu Pro Ser Val Met Ser Tyr
305                 310                 315                 320

Phe Gln Ser Val Gly Asn Ser Tyr Ala Asn Ser Ile Trp Glu Glu Leu
                325                 330                 335

Leu Asn Pro Lys Ser Ser Glu Glu Ser Ser Glu Arg Asn Val Asn Asp
            340                 345                 350

Glu Gly Gln Ser Gly Val Leu Ser Ala Ser Arg Ala Arg Pro Arg Pro
        355                 360                 365

Arg Asp Pro Ile Pro Ile Lys Glu Arg Phe Ile Asn Ala Lys Tyr Val
    370                 375                 380

Glu Lys Lys Phe Val Gln Lys Leu Lys Val Asp Ser Arg Gly Pro Ser
385                 390                 395                 400

Val Thr Arg Gln Ile Trp Asp Ala Val Gln Asn Lys Lys Val Gln Leu
                405                 410                 415

Ala Leu Arg Leu Leu Ile Thr Ala Asp Ala Asn Ala Asn Thr Thr Phe
            420                 425                 430
```

```
Glu Gln Val Met Gly Gly Thr Glu Ser Ser Trp Ser Ser Pro Leu Ala
        435                 440                 445

Ser Leu Ala Gly Ala Leu Leu Arg Lys Asn Ser Leu Ser Ala Ser Gln
    450                 455                 460

Ser Gly Arg Arg Asn Trp Ser Val Pro Ser Leu Leu Ser Ser Pro Asp
465                 470                 475                 480

Asp Pro Gly Ser Arg Ser Gly Ala Leu Ser Pro Val Ser Arg Ser Pro
                485                 490                 495

Asp Ala Ala Gly Ser Gly Gly Ile Asp Glu Lys Asp Leu Arg Gly Cys
            500                 505                 510

Ser Leu Leu His Val Ala Cys Gln Ile Gly Asp Ile Ser Leu Ile Glu
        515                 520                 525

Leu Leu Leu Gln Tyr Gly Ala Gln Ile Asn Cys Val Asp Thr Leu Gly
    530                 535                 540

Arg Thr Pro Leu His His Cys Val Leu Cys Gly Asn Asn Ser Cys Ala
545                 550                 555                 560

Lys Leu Leu Leu Thr Arg Gly Ala Lys Ala Gly Ala Val Asp Lys Glu
                565                 570                 575

Gly Lys Thr Pro Leu Glu Cys Ala Val Glu Lys Leu Gly Ala Ile Thr
            580                 585                 590

Asp Glu Glu Leu Phe Ile Met Leu Ser Glu Thr Ser Arg
        595                 600                 605


<210> 20
<211> 188
<212> PRT
<213> Physcomitrella patens

<400> 20
Met Ala Thr Glu Arg Val Ser Gln Glu Thr Thr Ser Gln Ala Pro Glu
  1                 5                  10                  15

Gly Pro Val Met Cys Lys Asn Leu Cys Gly Phe Phe Gly Ser Gln Ala
             20                  25                  30

Thr Met Gly Leu Cys Ser Lys Cys Tyr Arg Glu Thr Val Met Gln Ala
         35                  40                  45

Lys Met Thr Ala Leu Ala Glu Gln Ala Thr Gln Ala Ala Gln Ala Thr
     50                  55                  60

Ser Ala Thr Ala Ala Ala Val Gln Pro Pro Ala Pro Val His Glu Thr
 65                  70                  75                  80

Lys Leu Thr Cys Glu Val Glu Arg Thr Met Ile Val Pro His Gln Ser
                 85                  90                  95
```

```
Ser Ser Tyr Gln Gln Asp Leu Val Thr Pro Ala Ala Ala Ala Pro Gln
            100                 105                 110

Ala Val Lys Ser Ser Ile Ala Ala Pro Ser Arg Pro Glu Pro Asn Arg
        115                 120                 125

Cys Gly Ser Cys Arg Lys Arg Val Gly Leu Thr Gly Phe Lys Cys Arg
    130                 135                 140

Cys Gly Asn Leu Tyr Cys Ala Leu His Arg Tyr Ser Asp Lys His Thr
145                 150                 155                 160

Cys Thr Tyr Asp Tyr Lys Ala Ala Gly Gln Glu Ala Ile Ala Lys Ala
                165                 170                 175

Asn Pro Leu Val Val Ala Glu Lys Val Val Lys Phe
            180                 185


<210> 21
<211> 714
<212> PRT
<213> Physcomitrella patens

<400> 21
Met Pro Gly Pro Val Pro Leu Leu Ser Met Ser Val Lys Ser Glu Ser
  1               5                  10                  15

Leu Asp Asp Ile Gly Gly His Glu Lys Lys Ser Val Thr Gly Ser Glu
             20                  25                  30

Val Gly Gly Leu Asp Ala Gln Leu Trp His Ala Cys Ala Gly Gly Met
         35                  40                  45

Val Gln Leu Pro His Val Gly Ala Lys Val Val Tyr Phe Pro Gln Gly
     50                  55                  60

His Gly Glu Gln Ala Ala Ser Thr Pro Glu Phe Pro Arg Thr Leu Val
 65                  70                  75                  80

Pro Asn Gly Ser Val Pro Cys Arg Val Val Ser Val Asn Phe Leu Ala
                 85                  90                  95

Asp Thr Glu Thr Asp Glu Val Phe Ala Arg Ile Cys Leu Gln Pro Glu
            100                 105                 110

Ile Gly Ser Ser Ala Gln Asp Leu Thr Asp Asp Ser Leu Ala Ser Pro
        115                 120                 125

Pro Leu Glu Lys Pro Ala Ser Phe Ala Lys Thr Leu Thr Gln Ser Asp
    130                 135                 140

Ala Asn Asn Gly Gly Gly Phe Ser Ile Pro Arg Tyr Cys Ala Glu Thr
145                 150                 155                 160

Ile Phe Pro Pro Leu Asp Tyr Cys Ile Asp Pro Pro Val Gln Thr Val
                165                 170                 175
```

```
Leu Ala Lys Asp Val His Gly Glu Val Trp Lys Phe Arg His Ile Tyr
            180                 185                 190

Arg Gly Thr Pro Arg Arg His Leu Leu Thr Thr Gly Trp Ser Thr Phe
        195                 200                 205

Val Asn Gln Lys Lys Leu Val Ala Gly Asp Ala Ile Val Phe Leu Arg
    210                 215                 220

Ile Ala Ser Gly Glu Leu Cys Val Gly Val Arg Arg Ser Met Arg Gly
225                 230                 235                 240

Val Ser Asn Gly Glu Ser Ser Ser Trp His Ser Ser Ile Ser Asn Ala
                245                 250                 255

Ser Thr Ile Arg Pro Ser Arg Trp Glu Val Lys Gly Thr Glu Ser Phe
            260                 265                 270

Ser Asp Phe Leu Gly Gly Val Gly Asp Asn Gly Tyr Ala Leu Asn Ser
        275                 280                 285

Ser Ile Arg Ser Glu Asn Gln Gly Ser Pro Thr Thr Ser Ser Phe Ala
    290                 295                 300

Arg Asp Arg Ala Arg Val Thr Ala Lys Ser Val Leu Glu Ala Ala Ala
305                 310                 315                 320

Leu Ala Val Ser Gly Glu Arg Phe Glu Val Val Tyr Tyr Pro Arg Ala
                325                 330                 335

Ser Thr Ala Glu Phe Cys Val Lys Ala Gly Leu Val Lys Arg Ala Leu
            340                 345                 350

Glu Gln Ser Trp Tyr Ala Gly Met Arg Phe Lys Met Ala Phe Glu Thr
        355                 360                 365

Glu Asp Ser Ser Arg Ile Ser Trp Phe Met Gly Thr Ile Ala Ala Val
    370                 375                 380

Gln Ala Ala Asp Pro Val Leu Trp Pro Ser Ser Pro Trp Arg Val Leu
385                 390                 395                 400

Gln Val Thr Trp Asp Glu Pro Asp Leu Leu Gln Gly Val Asn Arg Val
                405                 410                 415

Ser Pro Trp Gln Leu Glu Leu Val Ala Thr Leu Pro Met Gln Leu Pro
            420                 425                 430

Pro Val Ser Leu Pro Lys Lys Lys Leu Arg Thr Val Gln Pro Gln Glu
        435                 440                 445

Leu Pro Leu Gln Pro Pro Gly Leu Leu Ser Leu Pro Leu Ala Gly Thr
    450                 455                 460

Ser Asn Phe Gly Gly His Leu Ala Thr Pro Trp Gly Ser Ser Val Leu
465                 470                 475                 480
```

```
Leu Asp Asp Ala Ser Val Gly Met Gln Gly Ala Arg His Asp Gln Phe
                485                 490                 495

Asn Gly Leu Pro Thr Val Asp Phe Arg Asn Ser Asn Tyr Lys His Pro
            500                 505                 510

Arg Glu Phe Ser Arg Asp Asn Gln Tyr Gln Ile Gln Asp His Gln Val
        515                 520                 525

Phe His Pro Arg Pro Val Leu Asn Glu Pro Pro Ala Thr Asn Thr Gly
    530                 535                 540

Asn Tyr Phe Ser Leu Leu Pro Ser Leu Gln Arg Arg Pro Asp Ile Ser
545                 550                 555                 560

Pro Ser Ile Gln Pro Leu Ala Phe Met Ser Ala Ser Gly Ser Ser Gln
                565                 570                 575

Leu Glu Thr Ser Ser Thr Lys Thr Ala Ala Thr Ser Phe Phe Leu Phe
            580                 585                 590

Gly Gln Phe Ile Asp Pro Ser Cys Thr Ser Lys Pro Gln Gln Arg Ser
        595                 600                 605

Thr Val Ile Asn Asn Ala Ser Val Ala Gly Asp Gly Lys His Pro Gly
    610                 615                 620

Thr Asn Asn Ser Ser Ser Asp Asn Lys Ser Glu Asp Lys Asp Asn Cys
625                 630                 635                 640

Arg Asp Val Gln Pro Ile Leu Asn Gly Ile Ala Val Arg Ser Gly Phe
                645                 650                 655

Arg Ala Asp Ile Ala Ala Lys Lys Phe Gln Gln Ser Asp Ser Ala His
            660                 665                 670

Pro Thr Glu Ala Ser Arg Gly Ser Gln Val Ser Ser Leu Pro Trp Trp
        675                 680                 685

Gln Thr Gln Asp Ala His Lys Asp Gln Glu Phe His Gly Asp Ser Gln
    690                 695                 700

Thr Pro His Thr Pro Ala Ser Gly Ser Gln
705                 710
```

<210> 22
<211> 469
<212> PRT
<213> Physcomitrella patens

<400> 22

```
Met Lys Glu Leu Asn Glu Asp Met Glu Ile Pro Leu Gly Arg Asp Gly
  1               5                  10                  15

Glu Gly Met Gln Ser Lys Gln Cys Pro Arg Gly His Trp Arg Pro Ala
            20                  25                  30
```

```
Glu Asp Asp Lys Leu Arg Glu Leu Val Ser Gln Phe Gly Pro Gln Asn
          35                  40                  45

Trp Asn Leu Ile Ala Glu Lys Leu Gln Gly Arg Ser Gly Lys Ser Cys
      50                  55                  60

Arg Leu Arg Trp Phe Asn Gln Leu Asp Pro Arg Ile Asn Arg His Pro
 65                  70                  75                  80

Phe Ser Glu Glu Glu Glu Glu Arg Leu Leu Ile Ala His Lys Arg Tyr
                 85                  90                  95

Gly Asn Lys Trp Ala Leu Ile Ala Arg Leu Phe Pro Gly Arg Thr Asp
            100                 105                 110

Asn Ala Val Lys Asn His Trp His Val Val Thr Ala Arg Gln Ser Arg
        115                 120                 125

Glu Arg Thr Arg Thr Tyr Gly Arg Ile Lys Gly Pro Val His Arg Arg
    130                 135                 140

Gly Lys Gly Asn Arg Ile Asn Thr Ser Ala Leu Gly Asn Tyr His His
145                 150                 155                 160

Asp Ser Lys Gly Ala Leu Thr Ala Trp Ile Glu Ser Lys Tyr Ala Thr
                165                 170                 175

Val Glu Gln Ser Ala Glu Gly Leu Ala Arg Ser Pro Cys Thr Gly Arg
            180                 185                 190

Gly Ser Pro Pro Leu Pro Thr Gly Phe Ser Ile Pro Gln Ile Ser Gly
        195                 200                 205

Gly Ala Phe His Arg Pro Thr Asn Met Ser Thr Ser Pro Leu Ser Asp
    210                 215                 220

Val Thr Ile Glu Ser Pro Lys Phe Ser Asn Ser Glu Asn Ala Gln Ile
225                 230                 235                 240

Ile Thr Ala Pro Val Leu Gln Lys Pro Met Gly Asp Pro Arg Ser Val
                245                 250                 255

Cys Leu Pro Asn Ser Thr Val Ser Asp Lys Gln Gln Val Leu Gln Ser
            260                 265                 270

Asn Ser Ile Asp Gly Gln Ile Ser Ser Gly Leu Gln Thr Ser Ala Ile
        275                 280                 285

Val Ala His Asp Glu Lys Ser Gly Val Ile Ser Met Asn His Gln Ala
    290                 295                 300

Pro Asp Met Ser Cys Val Gly Leu Lys Ser Asn Phe Gln Gly Ser Leu
305                 310                 315                 320

His Pro Gly Ala Val Arg Ser Ser Trp Asn Gln Ser Leu Pro His Cys
                325                 330                 335
```

```
Phe Gly His Ser Asn Lys Leu Val Glu Glu Cys Arg Ser Ser Thr Gly
            340                 345                 350

Ala Cys Thr Glu Arg Ser Glu Ile Leu Gln Glu Gln His Ser Ser Leu
        355                 360                 365

Gln Phe Lys Cys Ser Thr Ala Tyr Asn Thr Gly Arg Tyr Gln His Glu
    370                 375                 380

Asn Leu Cys Gly Pro Ala Phe Ser Gln Gln Asp Thr Ala Asn Glu Val
385                 390                 395                 400

Ala Asn Phe Ser Thr Leu Ala Phe Ser Gly Leu Val Lys His Arg Gln
                405                 410                 415

Glu Arg Leu Cys Lys Asp Ser Gly Ser Ala Leu Lys Leu Gly Leu Ser
            420                 425                 430

Trp Val Thr Ser Asp Ser Thr Leu Asp Leu Ser Val Ala Lys Met Ser
        435                 440                 445

Ala Ser Gln Pro Glu Gln Ser Ala Pro Val Ala Phe Ile Asp Phe Leu
    450                 455                 460

Gly Val Gly Ala Ala
465
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<210> 23
<211> 218
<212> PRT
<213> Physcomitrella patens

<400> 23

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Met Ala Asp Ser Tyr Gly His Asn Ala Gly Ser Pro Glu Ser Ser Pro
  1               5                  10                  15

His Ser Asp Asn Glu Ser Gly Gly His Tyr Arg Asp Gln Asp Ala Ser
             20                  25                  30

Val Arg Glu Gln Asp Arg Phe Leu Pro Ile Ala Asn Val Ser Arg Ile
         35                  40                  45

Met Lys Lys Ala Leu Pro Ser Asn Ala Lys Ile Ser Lys Asp Ala Lys
     50                  55                  60

Glu Thr Val Gln Glu Cys Val Ser Glu Phe Ile Ser Phe Ile Thr Gly
 65                  70                  75                  80

Glu Ala Ser Asp Lys Cys Gln Arg Glu Lys Arg Lys Thr Ile Asn Gly
                 85                  90                  95

Asp Asp Leu Leu Trp Ala Met Ser Thr Leu Gly Phe Glu Asp Tyr Val
            100                 105                 110

Glu Pro Leu Lys Val Tyr Leu His Lys Tyr Arg Glu Leu Glu Gly Glu
        115                 120                 125
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Lys Ala Ser Thr Ala Lys Gly Gly Asp Gln Gln Gly Gly Lys Glu Gly
130 135 140

Ser Gln Gly Val Met Gly Ser Met Gly Met Ser Gly Gly Met Asn Gly
145 150 155 160

Met Asn Gly Thr Met Asn Gly Asn Met His Gly His Gly Ile Pro Val
165 170 175

Ser Met Gln Met Leu Gln Gln Ser Tyr Gly Gln Gln Ala Pro Pro Gly
180 185 190

Met Met Tyr Ser Pro His Gln Met Met Pro Gln Tyr Gln Met Pro Met
195 200 205

Gln Ser Gly Gly Asn Gln Pro Arg Gly Val
210 215

<210> 24
<211> 412
<212> PRT
<213> Physcomitrella patens

<400> 24
Met Met Glu Ala Glu Gln Ser Tyr Val Gln Lys Leu Glu Ser Leu Leu
1 5 10 15

Gly Gly Val Ser Thr Leu Val Arg Glu Glu Glu Glu Thr Ala Ser Val
20 25 30

Ser Glu Asp Glu Asp Asp Ser Asn Ser Leu Pro Gln Ile Gln Val Ala
35 40 45

Val Lys Ser Lys Arg Lys Gly Glu Arg Arg Lys Arg Arg Glu Arg Ala
50 55 60

Leu Glu Arg Ala Glu Lys Val Ala Thr Asp Leu Ala Ser Ala Pro Pro
65 70 75 80

Leu Pro Lys Pro Lys Lys Pro Gln Leu Ala Ala Asp Pro Ser Asp Pro
85 90 95

Val Arg Ala Tyr Leu Arg Asp Ile Gly Arg Thr Lys Leu Leu Thr Ala
100 105 110

Arg Glu Glu Val Asp Leu Ser His Gln Ile Gln Asp Leu Leu Lys Leu
115 120 125

Glu Asn Ile Lys Ser Asn Leu Glu Arg Glu Ile Gly Arg Asn Ala Thr
130 135 140

Ile Gly Glu Trp Ser Arg Ala Val Gly Met Glu Gln Asn Ala Phe Glu
145 150 155 160

Ala Arg Leu Lys Lys Gly Arg Phe Ala Lys Asp Lys Met Val Asn Ser
165 170 175

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Asn Leu Arg Leu Val Val Ser Ile Ala Lys Asn Tyr Gln Gly Arg Gly
            180                 185                 190

Met Thr Leu Gln Asp Leu Ile Gln Glu Gly Ser Met Gly Leu Val Arg
        195                 200                 205

Gly Ala Glu Lys Phe Asp Pro Thr Lys Gly Phe Lys Phe Ser Thr Tyr
    210                 215                 220

Ala His Trp Trp Ile Arg Gln Ala Val Thr Arg Ser Ile Ala Asp Gln
225                 230                 235                 240

Ser Arg Thr Phe Arg Leu Pro Ile His Leu Tyr Glu Val Ile Ser Arg
                245                 250                 255

Ile Asn Lys Ala Lys Arg Met Leu Val Gln Glu His Gly Arg Glu Ala
            260                 265                 270

Arg Asn Glu Glu Val Ala Glu Leu Val Gly Leu Thr Val Glu Lys Leu
        275                 280                 285

Lys Ser Val Val Lys Ser Ala Lys Ala Pro Gly Ser Met Glu Arg Pro
    290                 295                 300

Ile Gly Lys Asp Gly Asp Thr Thr Leu Gly Glu Leu Val Ala Asp Thr
305                 310                 315                 320

Asp Val Asp Ser Pro Glu Asp Ala Ile Val Lys Gln Leu Met Arg Gln
                325                 330                 335

Asp Ile Glu Gly Val Leu Arg Thr Leu Asn Pro Arg Glu Arg Glu Val
            340                 345                 350

Leu Arg Leu Arg Phe Gly Leu Asp Asp Gly Arg Ser Lys Thr Leu Glu
        355                 360                 365

Glu Ile Gly Gln Ile Phe Lys Ala Thr Arg Glu Arg Ile Arg Gln Ile
    370                 375                 380

Glu Ala Lys Ala Met Arg Lys Leu Arg Gln Pro Ser Arg Asn Ser Ile
385                 390                 395                 400

Leu Arg Glu Tyr Leu Asp Val Lys Ser Asp Ala Ile
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<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 25
caggaaacag ctatgacc

<210> 26
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 26
ctaaagggaa caaaagctg 19

<210> 27
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 27
tgtaaaacga cggccagt 18

<210> 28
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

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atcccgggca gcgagcacac agctagcaac tctt 34

<210> 29
<211> 32
<212> DNA
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gcgagctcac tccctcacgc ggttgacaat ct 32

<210> 30
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<212> DNA
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tggcggcctc ggtcttcttc tcagt 25

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<210> 32
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gcgagctctg gccgtaaaat cagttgtggc gctt 34

<210> 33
<211> 25
<212> DNA
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<400> 33
cagcgaagcc caatcgggat cagca 25

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<220>
<223> Description of Artificial Sequence: Primer

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atcccgggag gaggacttgc ggaatgcaaa tc 32

<210> 35
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<220>
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<400> 35
gcgatatcca cctgcttcca ctctctactt atg 33

<210> 36
<211> 25
<212> DNA
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<400> 36
gacacccgat tgagccggca agacg 25

<210> 37
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<212> DNA
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<220>
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<400> 37
atcccgggca ccagtcccgc ttagtgtgtg tgt 33

<210> 38
<211> 31
<212> DNA
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<220>
<223> Description of Artificial Sequence: Primer

<400> 38
gcgagctctt gatgcgactc gctctctcga t 31

<210> 39
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
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<400> 39
cggcgagtgc agcagcttct agaacg 26

<210> 40
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<212> DNA
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<400> 40
atcccgggta tcgatctgga gcccgttgca a 31

<210> 41
<211> 32
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<220>
<223> Description of Artificial Sequence: Primer

<400> 41
gcgagctcct ccaaaggact ttgaaatata gc 32

<210> 42
<211> 33
<212> DNA
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<220>
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<400> 42
gatatcggaa gaagaatcca agggaatgcg gtt 33

<210> 43
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<400> 43
gcgagctcta tgcttccgtg ggaggagctt cac 33

<210> 44
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<212> DNA
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<220>
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ccggctgggt tgcctcagct tgcgca 26

<210> 45
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cgctccatcg aacctggtgc ctttgc 26

<210> 46
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<212> DNA
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<210> 47
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gcgagctcgc agcagaagaa atccacttct ggt 33

<210> 48
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gggtgccggt tgatgcgagg gtccag 26

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atcccgggct gttgtgtaca gtctgtgga 29

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<210> 51
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gcgctgcaga tttcatttgg agaggacacg 30

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cgcggccggc ctcagaagaa ctcgtcaaga aggcg 35

<210> 53
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gctgacacgc caagcctcgc tagtc 25

<210> 54
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<210> 55
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<210> 56
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<220>
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gcgatatcca cctgcttcca ctctctactt atg 33

<210> 57
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<210> 58
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<210> 59
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<210> 60
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<210> 61
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<210> 62
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<210> 63
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gcgagctcac tccctcacgc ggttgacaat ct 32

<210> 64
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<210> 66
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<210> 67
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gcgaagccca atcgggatca gcagca 26

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cgtaccacga ttgctctagc gcacgt 26

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gcgatatcgg aagaagaatc caagggaatg cggtt 35

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atcccgggca gcgagcacac agctagcaac tctt 34

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gccgctggac cagacctcgg aatgt 25

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gaggcagtca tgcaatcgac cccaa 25

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